

PESTICIDE SALES AND PARKINSON DISEASE IN BRAZIL

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Background and Aims: Pesticide exposure has been implicated in several environmental and health problems, including Parkinson's disease (PD). Pesticide use in Brazil has increased so significantly in the last 2 decades that it is been considered the top consumer of these substances in the world. The present study aimed at evaluating the association between the per capita sales of pesticides in 1996 and hospitalization rates by PD between 1997 and 2007.

Methods: Data on every hospitalization by PD, between 1997 and 2007, among individuals 20 years or older, were retrieved from Brazilian Hospitalization System, and used to estimate PD hospitalization rates in each of the 500 Brazilian micro regions. Spearman correlation coefficients were then calculated between PD hospitalization rates and the per capita sales of pesticides in the same micro regions. Correlation coefficients were calculated according to three age strata (20-49; 50-69; and \geq 70 years old), sex, and rural/urban micro region status. In addition, micro regions were grouped based on quintiles of per capita pesticide sales, PD hospitalization rates were calculated for each quintile. Rate ratios (RR) were then calculated using the first quintile as reference.

Results: Correlation between per capita sales of pesticide and PD hospitalization rates for all 500 micro regions was just moderate (20-49: $r=0.336$, $p<0.001$; 50-69: $r=0.418$, $p<0.001$; \geq 70: $r=0.490$, $p<0.001$). However, when correlation analysis was performed only for the rural micro regions, the magnitude of the coefficients slightly increased (20-49: $r=0.383$, $p<0.001$; 50-69: $r=0.450$, $p<0.001$; \geq 70: $r=0.540$, $p<0.001$). Finally, it was observed that the higher the per capita sales of pesticides in rural micro regions, the higher the risk to be hospitalized by PD (2nd vs. 1st quintile: RR 1.14; 3rd vs. 1st quintile: RR 3.18; 4th vs. 1st quintile: RR 6.05; and 5th vs. 1st quintile: RR 5.84). Risk estimates were even higher among women, when, depending on quintile, it was 7 fold higher.

Conclusions: In agreement with recent international evidences, our results suggest that pesticide exposure may increase the risk of PD.